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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/829,546	04/22/2004	Robert Malcolm Setbacken	8371/13	7292

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BRINKS HOFER GILSON & LIONE
P.O. BOX 10395
CHICAGO, IL 60610

EXAMINER	
MONBLEAU, DAVIENNE N	

ART UNIT	PAPER NUMBER
2878	

DATE MAILED: 07/12/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/829,546	SETBACKEN ET AL.	
	Examiner	Art Unit	
	Davienne Monbleau	2878	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *23 May 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-14 and 27-47* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-14 and 27-47* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *22 April 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

The amendment filed on 5/23/06 has been entered. Claim 8 has been amended. Claims 15-26 have been canceled. New claim 47 has been added. Claims 1-14 and 27-47 are pending.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1, 3-14, and 47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okumura et al. (U.S. 6,803,560) in view of Chin.

Regarding claim 1, *Okumura* teaches (Figure 2) a positional encoder assembly comprising a light source (1) to generate an optical signal, an optical element support structure (8) housing a refractive optic (2) to direct the optical signal, the optical support structure (8) defining a projection, a frame defining a cavity, a hollow within which the light source (1) is

disposed, and at least one recess to receive the projection, and a sensor (6) disposed within the cavity and adapted to generate an electrical signal in response to the optical signal. *Okumura* does not teach that the frame is a leadframe. *Chin* teaches (Figure 8) a positional encoder assembly comprising a leadframe (407) with a cavity containing a light source (401) and a sensor (402). It would have been obvious to one of ordinary skill in the art at the time of the invention to use a leadframe in *Okumura*, as taught by *Chin,* to provide a frame with sufficient electrical connection and isolation means to electrically connect the OPTO-electronic devices. *Okumura* does not teach a circuit board. *Chin* teaches (paragraph [0014]) that a circuit board may also be used. It would have been obvious to one of ordinary skill in the art at the time of the invention to connect the frame to the circuit board, as suggested by *Chin*, to provide an efficient means to electrically connect the leadframe to other electronic equipment, such as a processer. In this case, the leadframe would be disposed on the circuit board assembly, which automatically positions the sensor at a predetermined elevation with respect to the circuit board assembly.

Regarding claim 3, *Okumura* as modified by *Chin* teaches (*Chin*, Figure 8) that the lead frame has a contact disposed beneath the sensor.

Regarding claim 4, *Okumura* as modified by *Chin* teaches (*Chin*, Figure 8) an external connector protruding from the lead frame, but does not teach that the external connector is connectable to the circuit board assembly. It would have been obvious, however, to one of ordinary skill in the art at the time of the invention that the external connect is connectable to the circuit board in *Okumura* as modified by *Chin* in order to output the detected signal and send it to a processor.

Regarding claim 5 and 6, *Okumura* as modified by *Chin* teaches (*Chin*, Figure 8) a leadframe (407) with an external connector, but does not teach the specific connection configuration of the emitter (401) and the sensor (402). It would have been obvious, however, to one of ordinary skill in the art at the time of the invention to use particular connection elements, such as wire bonds and pads, in *Okumura* as modified by *Chin* such as wire bonds and pads, to provide efficient electrical connection of devices on circuits.

Regarding claims 7 and 47, *Okumura* teaches (Figure 2) that the cavity is enclosed, but does not specifically teach an encapsulant. *Chin* teaches (Figure 8) an optically transparent encapsulant layer (410) disposed on the sensor (402). It would have been obvious to one of ordinary skill in the art at the time of the invention to use an encapsulant in *Okumura*, as taught by *Chin*, to isolate the emitter/sensor from harmful external effects and stabilize its operating conditions.

Regarding claim 8, *Okumura* as modified by *Chin* teaches (*Chin*, Figure 8) that the optically transparent encapsulant layer (410) encapsulates the sensor (402), but does not teach that it encapsulates the wire bonds and connector pads. It would have been obvious, however, to one of ordinary skill in the art at the time of the invention to encapsulate the connector elements in *Okumura* as modified by *Chin* to isolate the emitter/sensor and connector elements from harmful external effects and stabilize its operating conditions.

Regarding claim 9, *Okumura* as modified by *Chin* teaches (*Chin*, Figure 8) that the optically transparent encapsulant layer (410) is contained within the cavity of the leadframe (407).

Regarding claim 10, *Okumura* teaches (Figure 2) a code scale (4), but does not teach that it is a disc or that it is disposed between the optical support structure (8) and the leadframe. *Chin* teaches (Figure 8) a code disc disposed between an optical element (404) and the leadframe (407). It would have been obvious to one of ordinary skill in the art at the time of the invention to use a particular scale (i.e. code disc) in *Okumura*, as taught by *Chin*, based upon the object whose position needs to be detected. It would have been obvious to one of ordinary skill in the art at the time of the invention to place the code disc in a particular configuration in *Okumura*, such as of that in *Chin*, based upon arrangement of the optical elements, the object to be detected, and the desired detection characteristics.

Regarding claim 11, *Okumura* as modified by *Chin* teaches (*Okumura*, Figure 2) a lens (2) but does not teach that it is prismatic. It would have been obvious, however, to one of ordinary skill in the art at the time of the invention to use a particular type of lens (i.e. prismatic) in *Okumura* as modified by *Chin* based upon the desired optical characteristics of the device and the particular need for controlling the light.

Regarding claims 12-14, *Okumura* as modified by *Chin* teaches that the light source and sensor would have predetermined elevations but does not teach the specific value of the predetermined elevations. It would have been obvious, however, to one of ordinary skill in the art at the time of the invention to use a particular structure arrangement, such as a predetermined height, in *Okumura* as modified by *Chin* based on the desired characteristics for the overall device, as well as the focusing needs of the optical elements.

Claims 27, 28, 30-38, and 40-46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chin in view of Okumura.

Regarding claim 27, *Chin* teaches (Figure 2) a positional encoder assembly comprising a light source (401) to generate an optical signal, a leadframe (407), the leadframe defining a first cavity and a hollow within which the light source (401) is disposed, a connector located externally to the leadframe, and a sensor (6) disposed within a second cavity supported upon a leadframe contact and adapted to generate an electrical signal in response to the optical signal. *Chin* teaches (paragraph [0014]) that a circuit board may also be used, but does not teach connecting a leadframe to a circuit board. It would have been obvious, however, to one of ordinary skill in the art at the time of the invention to connect the leadframe to a circuit board to provide an efficient means to electrically connect the device to other electronic equipment, such as a signal processor. In this case, the leadframe would be disposed on the circuit board assembly, which positions the sensor at a predetermined elevation with respect to the circuit board assembly and connectors. *Chin* does not teach the specific connection configuration of the emitter (401) and the sensor (402). It would have been obvious, however, to one of ordinary skill in the art at the time of the invention to various connection elements, such as wire bonds and pads, in *Chin* to provide efficient electrical connection of devices on circuits. It would have also been obvious to one of ordinary skill in the art at the time of the invention to use a particular connector configuration in *Chin* based on the individual characteristics of each element. Lastly, *Chin* teaches (Figure 8) that the first and second cavity is the same cavity, but does not teach two separate cavities. *Okumura* teaches (Figure 2) a positional encoder device comprising a frame with individual cavities for the sensor and detector. It would have been obvious to one of ordinary skill in the art at the time of the invention to use separate cavities in *Chin*, as taught by

Okumura, to shield the detector from ambient light that could affect the accuracy of the detection.

Regarding claim 37, *Chin* teaches (Figure 2) a positional encoder assembly comprising a light source (401) to generate an optical signal, a leadframe (407), the leadframe defining a first cavity and a hollow within which the light source (401) is disposed, a connector located externally to the leadframe, and a sensor (6) disposed within a second cavity supported upon a leadframe contact and adapted to generate an electrical signal in response to the optical signal. *Chin* teaches (paragraph [0014]) that a circuit board may also be used. It would have been obvious to one of ordinary skill in the art at the time of the invention to connect the leadframe to a circuit board to provide an efficient means to electrically connect the device to other electronic equipment, such as a signal processor. In this case, the leadframe would be disposed on the circuit board assembly, which positions the sensor at a predetermined elevation with respect to the circuit board assembly and connectors. *Chin* does not teach the specific connection configuration of the emitter (401) and the sensor (402). It would have been obvious, however, to one of ordinary skill in the art at the time of the invention to various connection elements, such as wire bonds and pads, in *Chin* to provide efficient electrical connection of devices on circuits. It would have also been obvious to one of ordinary skill in the art at the time of the invention to use a particular connector configuration in *Chin* based on the individual characteristics of each element. Lastly, *Chin* teaches (Figure 8) that the first and second cavity is the same cavity, but does not teach two separate cavities. *Okumura* teaches (Figure 2) a positional encoder device comprising a frame with individual cavities for the sensor and detector. It would have been obvious to one of ordinary skill in the art at the time of the invention to use separate cavities with

specific relative heights in *Chin*, as taught by *Okumura*, to shield the detector from ambient light that could affect the accuracy of the detection.

Regarding claims 28 and 38, *Chin* as modified by *Okumura* teaches (*Chin*, Figure 8) an optical element (404) to direct the optical signal that is mounted to the top of the leadframe (407) but does not teach the means of mounting. It would have been obvious to one of ordinary skill in the art at the time of the invention to use a particular mounting means, such as a protrusion and recess structure, in *Chin* as modified by *Okumura* to provide stable attachment for the optical element and prevent misalignment.

Regarding claims 30 and 40, *Chin* as modified by *Okumura* teaches (*Chin*, Figure 8) an optically transparent encapsulant layer (410) disposed on the sensor (402).

Regarding claims 31 and 41, *Chin* as modified by *Okumura* teaches (*Chin*, Figure 8) an optically transparent encapsulant layer (410), but does not teach that it encapsulates the wire bonds and connector pads. It would have been obvious, however, to one of ordinary skill in the art at the time of the invention to encapsulate the connector elements in *Chin* as modified by *Okumura* to isolate the emitter/sensor and connector elements from harmful external effects and stabilize its operating conditions.

Regarding claims 32 and 42, *Chin* as modified by *Okumura* teaches (*Chin*, Figure 8) that both the emitter and sensor have an optically transparent encapsulant layer (410). Thus, the encapsulant layer would be contained in both cavities.

Regarding claims 33 and 43, *Chin* teaches (Figure 8) a code disc disposed between an optical element (404) and the leadframe (407).

Regarding claims 34 and 44, *Chin* teaches (Figure 8) a reflective optical element (404), but does not teach a refractive lens. *Okumura* teaches (Figure 2) a lens (2) but does not teach that it is prismatic. It would have been obvious, however, to one of ordinary skill in the art at the time of the invention to use a particular type of optical configuration (i.e. prismatic lens) in *Chin* as modified by *Okumura* based upon the desired optical characteristics of the device and the particular need for controlling the light.

Regarding claims 35 and 45, *Chin* as modified by *Okumura* teaches that the light source and sensor would have predetermined elevations but does not teach the specific value of the predetermined elevations. It would have been obvious, however, to one of ordinary skill in the art at the time of the invention to use a particular structure arrangement, such as a predetermined height, based on the desired characteristics for the overall device, as well as the focusing needs of the optical elements.

Regarding claims 36 and 46, *Chin* as modified by *Okumura* teaches (*Chin*, Figure 8) that the light source (401) lies above the leadframe contact.

Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Okumura in view of Chin, as applied to claim 1 above, and in further view of Franklin.

Regarding claim 2, *Okumura* as modified by *Chin* teaches (*Chin*, Figure 8) a sensor (402), but does not teach an OPTO-ASIC sensor. *Franklin* teaches (column 4, lines 61-64) a position encoder system comprising OPTO-ASIC sensor on a circuit board. It would have been obvious to one of ordinary skill in the art at the time of the invention to use OPTO-ASIC sensors in *Chin* as modified by *Okumura*, as taught by *Franklin*, because they are easier to fabricate.

Additionally, one of ordinary skill in the art would have been able to choose a particular sensor based on the detection needs and desired characteristics of the overall device.

Claims 29 and 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chin in view of Okumura, as applied to claims 27 and 37 above, respectively, and in further view of Franklin.

Regarding claims 29 and 39, *Chin* in view of *Okumura* teaches (Figure 8) a sensor (402), but does not teach an OPTO-ASIC sensor. *Franklin* teaches (column 4, lines 61-64) a position encoder system comprising OPTO-ASIC sensor on a circuit board. It would have been obvious to one of ordinary skill in the art at the time of the invention to use OPTO-ASIC sensors in *Chin* as modified by *Okumura*, as taught by *Franklin*, because they are easier to fabricate. Additionally, one of ordinary skill in the art would have been able to choose a particular sensor based on the detection needs and desired characteristics of the overall device.

Response to Arguments

Applicants' arguments filed 5/23/06 have been fully considered but they are not persuasive.

Applicants argue that the cited prior art of record (*Chin, Okumura, and Franklin*) do not teach combining a lead frame with a circuit board assembly. The Examiner does not find this persuasive. *Chin* does teach (Figure 8) that both leadframes and printed circuit boards may be used as a frame/support for an emitter and receiver in a sensor assembly. And although *Chin* doesn't specifically teach that a leadframe may be attached on top of a printed circuit board, it is well known in the art that leadframes are typically connected to some type of circuit board in order to provide electrical connections to the sensor assembly and other circuitry components

(i.e. controller, processor). Thus, although *Chin* doesn't specifically teach using a leadframe and printed circuit board together, it doesn't render the combination unobvious in light of the general knowledge of one skilled in the art.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure because they teach sensor devices comprising leadframes connected to a circuit board.

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Davienne Monbleau whose telephone number is 571-272-1945. The examiner can normally be reached on Monday through Friday 9-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Georgia Epps can be reached on 571-272-2328. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Davienne Monbleau

DNM

Stephone B. Allen
Primary Examiner